REMARKS

Status of the claims:

With the above amendments, claims 3-8 have been added. Thus, claims 1-8 are pending and ready for further action on the merits. No new matter has been added by way of the above amendments. Claim 3 has support at page 24, line 5. Claim 4 has support at page 29, lines 11-19. Claims 5-7 have support in Tables 9 and 10 of the specification. Support for claim 8 is found in item (6) on page 4 in the specification. Reconsideration is respectfully requested in light of the following remarks.

Rejections under 35 USC §103

Claim 1 has been rejected under 35 USC §103(a) as being unpatentable over JP '054 (Japanese Patent No. 58-031054).

Claims 1-2 have been rejected under 35 USC §103(a) as being unpatentable over JP '232 (Japanese Patent No. 10-110232).

Claims 1-2 have been rejected under 35 USC §103(a) as being unpatentable over JP '095 (Japanese Patent No. 09-256095).

Claim 2 has been rejected under 35 USC §103(a) as being unpatentable over JP '054 in view of Komatsubara '948 (US Patent No. 4,718,948).

Claim 2 has also been rejected under 35 USC §103(a) as being unpatentable over JP '232 or JP '095 in view of Komatsubara '948.

These rejections are traversed for the following reasons.

Present Invention

The present invention relates to an aluminum sheet material that is designed for automobiles that has a composition that is carefully controlled so that the composition provides ideal characteristics for aluminum sheet metal for automobiles. The present invention achieves excellent spot weldability, excellent impact-absorbing energy property and has excellent surface treatment properties, which are essential for an aluminum sheet material for automobiles. The properties of the present aluminum sheet material are attained as a result of the synergetic effect attained by the combination of Si, Mg, Zn, Cu, Fe, Mn, and one or more members selected from Cr, Ti, Zr and V. The aluminum sheet material of the present invention attains remarkably excellent spot weldability, while maintaining strength and bending properties. This aluminum sheet material is obtained only when all of the alloying elements are within the ranges defined in the present invention.

no specific exek. results

Disclosure of JP '054

JP '054 discloses an aluminum alloy composition that is 2.3-3.5 % weight Si, 0.2-0.8 % weight Mg, 0.05-0.5 % weight Zn, less than or equal to 0.3 % weight Cu, less than or equal to 0.3 % weight Fe, and 0.4-0.9 % weight Mn.

JP '054 fails to disclose using higher amounts of Cu and Fe improve the weldability of the alloy composition.

Specific evidence

Disclosure of JP '232

JP '232 discloses an Al-Mg-Si alloy that is obtained by subjecting a directly cast and rolled sheet of an Al alloy having a composition containing, as essential elements, by mass, 0.2 to 3.0% Si and 0.2 to 3.0% Mg, one or more of two kinds among 0.01 to 0.5% Mn, 0.01 to 0.5% Cr, 0.01 to 0.5% Zr and 0.001 to 0.5% Ti, furthermore containing one or two kinds among 0 to 2.5% Cu, 0 to 0.2% Sn and 0 to 2% Zn, in which the content of Fe is regulated to be less than or equal to 1.0%, with the balance being Al with inevitable impurities to cold rolling as well. With this alloy, the maximum grain size in the metallic structure of this sheet is regulated to be less than or equal to 100μm, and the maximum length of continuous Mg_2Si compounds in the surface layer part is regulated to be less than or equal to 50μm.

Disclosure of JP '095

JP '095 discloses a composition of an Al alloy sheet that comprises by weight, as essential components, 0.8 to 3.5% Si, greater than 0.6 to 1.4% Mn, 0.1 to 1.0% Fe and 0.1 to 0.5% Cu, furthermore containing, as needed, one or two of less than or equal 0.6% Mg and less than or equal to 0.2% Zn, with the balance being Al and inevitable impurities. The Al alloy having the above composition is subjected to a final annealing in the temperature range of 350 to 450°C. The time for the final annealing is preferably regulated to be greater than or equal to 30 minutes. Moreover, the cooling rate after the final annealing is preferably regulated to less than or equal to 100°C/hr. The Al alloy sheet has both characteristics of formability as well as good surface quality.

Disclosure of Komatsubara '948

Komatsubara '948 discloses rolled aluminum alloy sheets with strength and formability. The rolled aluminum alloy sheets are provided to be formed into parts for use in an application where high strength is required after paint baking. The aluminum alloy has a composition consisting essentially of Si 1.2-2.5%, Mg 0.25-0.85%, Fe 0.05-0.4%, Cu 0.1-1.5%, and at least one of Mn 0.05-0.6%, Cr 0.05-0.3%, and Zr 0.05-0.15%, with the balance being essentially aluminum.

Removal of the Rejection over JP '054

The Examiner asserts that JP '054 teaches an aluminum alloy composition, which overlaps the composition as presently claimed. However, Applicants assert that the composition and property of the aluminum alloy of the present invention are distinct from those disclosed in JP '054.

Sn is an indispensable component in JP '054 in order to prevent the deterioration of mechanical strength after paint-baking treatment, since it accelerates high temperature aging and fine precipitation of intermediate phase β'. In contrast, the aluminum alloys of the present invention need not contain Sn at all.

Further, JP '054 requires Cu at a percent weight of less than 0.3 whereas the instant invention has Cu in the range of 0.2. wt% to 1.5 wt% in the present aluminum alloys. The amount of Cu in the instant invention decreases the electrical conductivity and lowers the melting point of the alloy, to improve spot weldability, and enhances mechanical strength, to improve impact absorption energy (please see lines 21 to 25 on page 8 of the present specification). In addition, Fe in the instant invention is present in an amount of from 0.2 wt% to 1.5 wt% in order to improve toughness and impact absorption energy because of grain refining (see lines 4 to 5 on page 9 of the

present specification). In contrast Fe in JP '054 is present at less than 0.3 weight percent.

Moreover, the addition of Cu and Fe to the aluminum alloys disclosed in JP '054 is not essential, and the limitation of their amounts is only to show allowable upper limits. This is because Cu and Fe deteriorate corrosion resistance, though Cu enhances mechanical strength of the alloy.

JP '054 never suggests or teaches that addition of Cu and Fe improves the weldability as is one of the goals of the instant invention.

Further, the alloys in Table I on page 290 of JP '054 mentioned by the Examiner do not satisfy the alloy composition defined in the present invention.

Accordingly, it is believed that, for a person of ordinary skill in the art, it would be difficult to achieve the present invention based on the matters disclosed in JP '054. Withdrawal of the rejection is warranted and respectfully requested.

Removal of the Rejection over JP '232

Applicants assert that JP '232 is directed to an invention that is utterly different from the present invention, because the desired characteristics and object of JP '232 are distinct from those disclosed in the present invention.

Regarding JP '232, Applicants assert that the motivation requisite for an obviousness rejection is lacking as there is no particular suggestion to include the exact elements of the instant invention. In particular, Applicants assert that Zn, Cu, Fe, Mn, Cr, Ti, and Zr are optional in JP '232, whereas Zn, Cu, Fe, and Mn are part of the instant invention. Thus, JP '232 provides 127 different possible combinations (this is all the permutations available from 7 different variables). Because the ranges for the required components are not identical to those of the instant invention, this adds further possible combinations (for example, the Si range in JP '232 is 0.2-3 whereas claim 1 in the instant invention claims a Si range of 2.6-5.0).

Accordingly, Applicants assert that the Examiner is using hindsight reconstruction to arrive at the instant invention. Only knowledge in advance of the presently claimed invention could lead one of skill in the art to the combination that is taught in the instant invention. However, to "imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art references or record convey or suggest that knowledge is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore & Assoc. v. Garlock, Inc.* 220 USPQ 303, 311 (Fed. Cir., 1983).

Further, in the specification and claims of JP '232, structures of the alloy (specifically, composition, metal texture and casting condition) are limited so as to be suitable for strip casting (direct-casting rolling). Besides, the texture, which is characteristic of the direct casting rolled alloy, is also defined in claims of JP '232.

In contrast, the present invention has other uses and is not limited to strip casting.

Furthermore, one of the objects of the present invention is to achieve excellent spot weldability, good impact-absorbing energy properties as well as surface treatment properties, which are essential for an aluminum sheet material for automobiles. However, JP '232 never discloses nor suggests any of those properties.

Moreover, JP '232 provides no working example that satisfies the definition of the present invention.

Accordingly, a person of ordinary skill in the art would not modify the method described in JP '232 to obtain the composition and the properties of the instant invention, that are not even remotely suggested in JP '232. For the above reasons, Applicants assert that the rejection has been obviated. Withdrawal of the rejection is warranted and respectfully requested.

Removal of the Rejection over JP '095

Applicants assert that JP '095 is directed to an invention which utterly differs from the present invention, because the composition of the alloy and desired characteristics of JP '095 are distinct from those disclosed in the present invention.

The amounts of Si, Mg, Zn, Cu, and Fe in the present invention may be similar to those of JP '095, but the Mn range defined in the present invention is outside of the described range in JP '095. JP '095 describes that Mn is added in the range of from more than 0.6 wt% to 1.5 wt% or less, for the purpose of increasing mechanical strength, but its effect is small with an amount 0.6 wt% or less. However, according to the present invention, in which the amount of Mn is lower than 0.6 wt%, an alloy having excellent mechanical strength can be obtained. Accordingly, Applicants assert JP '095 teaches away from the present invention, and no one would be motivated to decrease the amount of Mn in the alloy of JP '095.

Further, JP '095 regards only the ductility as important, but does not consider the mechanical strength of the alloy. Therefore, the final annealing is carried out at a temperature range of 300°C to 450°C and then gradual cooling is carried out at a cooling rate of 100°C/hour or less (i.e. 0.028°C/sec). Thus, JP '095 obtains an alloy having poor mechanical strength (tensile strength). In contrast, the present invention aims to

have both good ductility and high mechanical strength. Therefore, the final annealing is carried out at the temperature of up to 530°C and then rapid cooling is carried out at a cooling rate of 3°C/second or above, to improve not only the ductility of the material but also its mechanical strength.

Accordingly, Applicants assert the present invention cannot be rendered obvious by the disclosure of JP '095 because JP '095 does not recognize the advantages of the instant invention. Withdrawal of the rejection is warranted and respectfully requested.

Removal of the Rejection over JP '054 in view of Komatsubara '948

As pointed out above, Sn is an indispensable component in JP '054 that prevents the deterioration of mechanical strength after paint-baking treatment. This is because it accelerates high temperature aging and fine precipitation of intermediate phase β'. In contrast, the aluminum alloys of the present invention need not contain Sn at all.

Further, JP '054 requires Cu at a percent weight of less than 0.3 whereas the instant invention has Cu in the range of 0.2. wt% to 1.5 wt% in the present aluminum alloys. The amount of Cu in the instant invention decreases the electrical conductivity and lowers the melting point of the alloy, to

improve spot weldability, and enhances mechanical strength, to improve impact absorption energy (please see lines 21 to 25 on page 8 of the present specification).

In addition, Fe in the instant invention is present in an amount of from 0.2 wt% to 1.5 wt% in order to improve toughness and impact absorption energy because of grain refining (see lines 4 to 5 on page 9 of the present specification). In contrast, Fe in JP '054 is present at less than 0.3 weight percent. Komatsubara '948 fails to correct this deficiency as Komatsubara '948 discloses a favorable Fe range of from 0.05-0.4 %. Thus, neither of the references realizes the unexpectedly superior properties that result from using higher amounts of Fe (i.e., improved weldability).

The addition of Cu and Fe to the aluminum alloys disclosed in JP '054 is not essential, and the limitation of Cu and Fe amounts in both JP '054 and Komatsubara '948 is only to show allowable upper limits. This is because Cu and Fe deteriorate corrosion resistance, though Cu enhances mechanical strength of the alloy.

JP '054 never suggests or teaches that addition of Cu and Fe improves the weldability as is one of the goals of the instant invention.

Further, the alloys in Table I on page 290 of JP '054 mentioned by the Examiner do not satisfy the alloy composition defined in the present invention.

Moreover, Komatsubara '948 discloses an amount of Si that falls outside the range of that of the present invention (more than 2.6 wt% to 5 wt% in the present invention) versus 1.2 wt% to 2.5 wt% in Komatsubara '948. Thus, one of ordinary skill in the art would not know if they were to use the Si percent disclosed in Komatsubara '948 (which falls outside of the instant invention range) or the range disclosed in JP '054 to arrive at the instant invention. Because JP '054 does not disclose the advantages associated with the instant invention, it is likely that the Si range in JP '054 would not be used. Accordingly, JP '054 in view of Komatsubara '948 cannot render obvious the instant invention, because they fail to suggest the elements of the instant invention. Accordingly, the rejection of claim 2 over JP '054 in view of Komatsubara '948 is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Removal of the Rejection over JP '095 or JP '232 in view of Komatsubara '948

As pointed out above, the amounts of Si, Mg, Zn, Cu, and Fe in the present invention are similar to those of JP '095, but

the Mn range claimed in the present invention is outside of the described range in JP '095. JP '095 describes that Mn is added in the range of from more than 0.6 wt% to 1.5 wt% or less, for the purpose of increasing mechanical strength. Thus, JP '095 prefers not to have Mn in an amount 0.6 wt% or less, as is claimed in the instant invention. However, the present invention succeeds in having excellent mechanical strength even though the amount of Mn is lower than 0.6 wt%. Accordingly, Applicants assert JP '095 teaches away from the present invention. Thus, one of ordinary skill in the art, in order to increase mechanical strength, would increase the amount of Mn to a range outside the instantly claimed range. This is incompatible with the disclosure of Komatsubara '948, wherein Komatsubara '948 discloses Mn as one of three possibilities to be added to the composition. Thus, one of ordinary skill in the art would not know if one should add Mn in the concentration that is disclosed in JP '095 or even add Mn at all (as Mn is only a possible component in Komatsubara '948).

Further, JP '095 regards only the ductility as important, but does not consider the mechanical strength of the alloy. Therefore, the final annealing is carried out at a temperature range of 300°C to 450°C and then gradual cooling is carried out at a cooling rate of 100°C/hour or less (i.e. 0.028°C/sec). Thus, JP '095 obtains an alloy having poor mechanical strength

(tensile strength). In contrast, the present invention aims to have both good ductility and high mechanical strength. Therefore, the final annealing is carried out at the temperature of up to 530°C and then rapid cooling is carried out at a cooling rate of 3°C/second or above, to improve not only the ductility of the material but also its mechanical strength.

JP '232 discloses Zn as an optional component whereas Komatsubara '948 does not disclose it as a feature in the instant invention. Accordingly, one of ordinary skill in the art would not know if Zn should be included in the alloy composition or not. As mentioned above, when one considers the optional components in JP '232, there are 127 possible combinations, many of which do not include Zn. Komatsubara '948 provides no motivation to include Zn as it is not even mentioned as a possible substitute. Accordingly, the rejection of claim 2 over JP '232 or JP '095 in view of Komatsubara '948 is inapposite. Withdrawal of all the rejections is warranted and respectfully requested.

Double Patenting

Claims 1-2 are provisionally rejected under obviousness double patenting as being unpatentable over claims 1-6 and 10-15 of US Application No. 09/331,966.

Claims 1-2 are provisionally rejected under obviousness double patenting as being unpatentable over claims 1 and 2 of US Application No. 09/644,830.

Claims 1-2 are provisionally rejected under obviousness double patenting as being unpatentable over claims 1-4 of US Application No. 09/738,048.

Claims 1-2 are provisionally rejected under obviousness double patenting as being unpatentable over claims 1 and 4 of Kashiwazaki '870 (US Patent No. 6,325,870).

Removal of all double patenting rejections

09/644,830 has been abandoned. Thus, the double patenting rejection with respect to this application is moot.

Kashiwazaki '870 discloses a Mn range that is outside of the claimed range. Thus, Applicants assert that a terminal disclaimer is not necessary for Kashiwazaki '870. Further, because the instant invention discloses a Mn range outside that of Kashiwazaki '870, the instant invention discloses unexpectedly superior properties to Kashiwazaki '870 that could not be surmised by the teaching of Kashiwazaki '870. In particular, the instant invention has superior bending properties to that of Kashiwazaki '870. Accordingly, Applicants submit that the double patenting rejection over Kashiwazaki '870

is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Regarding 09/331,966, and 09/738,048, please find the attached terminal disclaimer that should obviate the rejection over these applications. Accordingly, withdrawal of the rejections is warranted and respectfully requested.

Conclusion

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter such that a passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a two (2) month extension of time for filing a reply in connection with the present application, and the required fee of $400.00 is attached hereto.

If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg. No. 50,990), in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____

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MSW/TBS/crt

Attachment

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 3-8 have been added.